

Translation

PATENT COOPERATION TREATY

PCT/DE2003/002568



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P112671/WO/1	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/DE2003/002568	International filing date (day/month/year) 31 July 2003 (31.07.2003)	Priority date (day/month/year) 02 August 2002 (02.08.2002)
International Patent Classification (IPC) or national classification and IPC B01D 63/00		
Applicant DAIMLERCHRYSLER AG		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 26 February 2004 (26.02.2004)	Date of completion of this report 15 June 2004 (15.06.2004)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE2003/002568

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
pages _____ 1-11 _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the claims:
pages _____ 1-26 _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the drawings:
pages _____ 1/3-3/3 _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	1-26	YES
	Claims		NO
Inventive step (IS)	Claims	1-26	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-26	YES
	Claims		NO

2. Citations and explanations**1 Reference is made to the following documents:**

D1: DE-B-109 19 90 (UNIVERSAL OIL PRODUCTS COMPANY)
3 November 1960 (1960-11-03)

D2: US-A-3 241 293 (W. C. PFEFFERLE) 22 March 1966
(1966-03-22)

D3: US-A-5 645 626 (D. J. EDLUND ET AL) 8 July 1997
(1997-07-08) mentioned in the application

D4: EP-A-1 279 431 (TOYOTA JIDOSHA KK)
29 January 2003 (2003-01-29)

D5: WO-A-01/70736 (IDATECH) 27 September 2001
(2001-09-27) mentioned in the application.

2 Novelty

Document **D1**, which is considered to be the closest prior art, discloses:

a membrane module for the separation of hydrogen, comprising planar membrane cells (cf. D1, figures 2 and 3) which consist of two hydrogen-selective membranes (3, 4) surrounded by a flat frame ("sealing strips", cf. column 5, line 69 to column 6, line 2), a spacing layer (7) and a supply frame (94) having openings (10, 11, 16, 17) towards the side surfaces.

The membrane module differs from the subject matter of claim 1 in that the two membrane frames do not have facing raised edges which have openings (these openings (15) are provided instead in the spacer). In addition, it is not explicitly disclosed that the individual components are soldered or welded (on the other hand, "screws and clamps" (column 5, lines 67 to 69) and the above-mentioned "sealing strips" are disclosed).

The subject matter of claim 1 is therefore novel (PCT Article 33(2)).

3 Inventive step

3.1 The problem addressed by the present invention can therefore be considered that of reducing the number of necessary contact surfaces that must be assembled in a gas-tight manner, and also simplifying the assembly.

3.2 The solution to this problem as proposed in claim 1 of the present application involves an inventive step (PCT Article 33(3)) for the following reasons:

None of the search report citations discloses (or suggests) two membrane frames having raised edges which are sealed directly from one another and enclose the permeate chamber. The individual components are always planar and are provided with intermediate seals (cf. D2, figure 2 or D5, figure 11 or D4, figure 2) or comprise a spacer which has the same external dimensions as the membrane frames, so that at least two contact surfaces to be sealed are formed (cf. D5, figure 12).

In other solutions, such as the module disclosed in D3, the spacer is designed with open side surfaces,

which makes additional enclosure of the filtrate gas side necessary (cf. D3, figure 6).

The module designs disclosed in D4 and D5 are different in any case, because the feed and filtrate gas streams are conveyed internally in the module, and therefore the lateral connections can be dispensed with.

- 3.3 The module design disclosed in claim 1 is therefore not obvious to a person skilled in the art from documents D1 to D5, either alone or in combination.

Claims 2-13 are dependent on claim 1 and therefore likewise meet the PCT requirements for novelty and inventive step.

- 3.4 Claims 14-26 are directed to a method for the production of the claimed module and therefore likewise meet the PCT requirements for novelty and inventive step.

- 4 The industrial applicability is obvious.